

METHOD OF HANDLING PERMANENT SIGNALS

STEP-BY-STEP AND COMMUNITY DIAL OFFICES

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1. GENERAL

1.01 This section is reissued to include the use of plugging-up circuits in offices arranged for automatic timed release of connectors.

1.02 Frequency of patrol should be in accordance with local instructions. It is essential to good service to handle permanents promptly, particularly during periods of excessive trouble or heavy traffic.

1.03 If the tracer notices that there are more than the normal number of permanents while tracing a permanent signal, he should immediately report this condition as a possible indication of cable trouble to his supervisor. During periods when the test center is covered, normally, no more than six permanent signals should be traced before reporting the line terminal or connector terminal numbers.

1.04 Throughout the permanent signal routine, care should be exercised to avoid interrupting an established connection or causing damage to wipers and relay contacts.

1.05 Under normal conditions, it is determined at the test center when the permanent line of central office equipment should be freed and the method to be used. The following methods are listed in the normal order of preference:

- (1) Use plugging-up circuits as covered in Part 4.
- (2) Ground sleeve terminal of the permanent line as described in Method C.
- (3) Block line relays in accordance with local instructions.
- (4) Remove heat coils in accordance with local instructions.

Methods in (3) and (4) should not be used except under emergency conditions.

1.06 Whenever permanent signals are suspected of contribution to call-block alarms or overloaded primary master switches, the procedure in 3.56 through 3.59 may be applied.

1.07 A permanent signal on a customer line connected to a 1A line concentrator will hold one of the concentrator trunks busy in the connection to the central office. Holding one or

more of the concentrator trunks in this condition may affect the call-handling capacity of the concentrator. During periods of heavy traffic, when a permanent signal exists on a 1A line concentrator, it may be advisable to release the concentrator trunk for service. This may be done in the control office. When a permanent signal exists on the Gfeller line concentrator, it must be released at the remote unit or by disconnecting the station loop at the request of the testman.

1.08 Permanents occurring in common control or TOUCH-TONE® calling offices not equipped with permanent signal holding trunks are handled in the usual manner as the first selector is held off-normal. The originating register outpulsing controller or TOUCH-TONE calling signal to dial pulse converter circuit and associated trunk finder and converter finders, if used, are released after a 20-second timing period. The associated trunk busy (TB- or T2) relay is held operated.

1.09 When a permanent signal condition occurs in common control or TOUCH-TONE calling offices equipped with permanent signal holding trunks, the respective originating register outpulsing controller or TOUCH-TONE calling signal to dial pulse converter is seized and returns dial tone in the usual manner. After a 20-second timing period with no digits received, the register or dial pulse converter interprets this condition as a permanent signal. One, two, or three digits are outpulsed to seize a permanent signal holding trunk. When a permanent signal holding trunk is seized, a ground is applied to the sleeve lead which holds the corresponding trunk busy relay (TB- or T2) in the register trunk and link circuit or the converter trunk. The switch train is held operated, but the originating register or dial pulse converter and associated equipment is released.

1.10 After a permanent signal holding trunk is seized, a voice announcement circuit applies a 10-second voice challenge to the line. If the permanent signal remains after the announcement is completed, a receiver off-hook tone is applied for approximately 50 seconds. A permanent signal high tone is applied to the ring lead except during the voice announcement, receiver off-hook tone, or when the trouble operator is connected.

1.11 If the permanent signal condition has not cleared after application of the receiver off-hook tone, the permanent signal holding trunk is connected through the concentrating circuit to a trouble operator position. When the trunk has been connected by the concentrator to the trouble position, a class lamp (coin or non-coin) lights as a signal to the operator. The trunk also lights a class lamp (coin or noncoin) at the permanent signal trunk unit.

1.12 The trouble operator connects to the trunk and attempts to clear the trouble. The operator can perform some or all of the following:

- (a) Monitor
- (b) Ring on the line
- (c) Coin return or coin collect
- (d) Use receiver off-hook tone

If the permanent signal condition persists after these measures, the operator disconnects and further action is under control of the appropriate department in accordance with local procedure.

1.13 When a permanent signal condition occurs in offices equipped with permanent signal finders, due to no digits being dialed within 20 to 40 seconds after an off-hook signal, a permanent signal finder connects to the first selector associated with the line finder or line switch connected to the customer line. A 10-second voice challenge, followed immediately by receiver off-hook tone for about 50 seconds, is applied to the line.

1.14 If the customer hangs up during either interval, all equipment is restored to normal. However, if the permanent signal alarm does not clear at the conclusion of the tone cycle, the tone is disconnected, the permanent signal finder releases, and the permanent signal alarm and lamp function after 22 to 44 minutes. The permanent signal alarm is then processed the same as any other permanent signal alarm.

1.15 For offices equipped with automatic number identification, refer to Table A for a method of analysis for permanent signal record tickets.

2. APPARATUS

Methods A through L

2.01 1011G handset (dial hand test set) equipped with a W2CL cord, one 471A jack, and one 240A plug (2W39A cord). Strap terminals 3 and 4 of the 240A plug.

2.02 A supply of permanent signal tracing tickets, Form E-3937, and record of permanent signals, Form E-3938.

Methods A, D, and E

2.03 375A or 477A (make-busy) tools or equivalent, as required.

Methods A, D, and F

2.04 Form a loop approximately one inch in diameter in a piece of string, leaving a tail of sufficient length that when the loop is placed under the hub of the lower wiper of a switch, the string can be wrapped several times around the switch test jack spring.

Methods C and K

2.05 Testing cords as required for use with plugging-up circuits as follows:

- (a) W4AG cord, 12 feet long, equipped with one 289B plug, one 252A plug, and one 252B plug (4W6A cord) for use on frames equipped with other than 300-type connectors (or the replaced 121-type protector).
- (b) W4AL cord, 12 feet long, equipped with one 289B plug and one 301A plug (4W7A cord) for use with 444-type jacks.
- (c) W4AG cord, 12 feet long, equipped with one 289B plug, one 412A plug, and one 412B plug (4W11A cord) for use with 300-type connectors (or the replaced 121-type protector).

2.06 Patching cord, P3E, 3 feet long, equipped with two 310 plugs (3P7B cord) for use with each plugging-up panel.

2.07 Testing cord, W1M cord, 2 feet long, equipped with one KS-6780 connecting clip and one 360A tool for use on line finder bank terminal strips (other than solderless wrapped type) provided with ground strips.

2.08 Testing cord, W1U cord, 1 foot 8 inches long, equipped with one No. 2 test clip per Specification AT6928 and one KS-6780 connecting clip or equivalent, as required. This is for use on line finder bank terminal strips (other than solderless wrapped type) not provided with ground strips and for use in line switch offices.

2.09 Testing cord, W1AL cord, 2 feet long, equipped with two P-15A864 chucks, as required, for use on solderless wrapped line finder bank terminal strips.

Method D

2.10 Testing cords, required with certain type selector repeater trunks, assembled locally (Fig. 1) as follows:

- (a) W1AE cord, 12 feet long, equipped with two 360A tools and one 411A (test pick) tool.
- (b) W1AF cord, 8 feet 6 inches long, equipped locally with one 360A tool, one 310 plug, and one 141 cord tip.

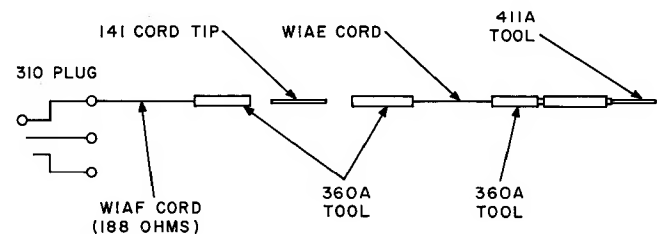


Fig. 1

Methods G, H, I, and J

2.11 KS-6320 orange stick.

Method H

2.12 Patching cord, P3AA cord, 10 feet long, equipped with one 310 plug and one 240A plug (3P30A cord) for use in releasing connector permanents.

Method K

2.13 324 (relay blocking) tools, as required, for use in line switching offices.

2.14 258-type make-busy plug.

3. METHOD**A. Locating Permanents at Local First and Service Code Selectors**

Caution: Exercise extreme care when locating permanent signals in service code selectors associated with auxiliary trunks for ANI and CAMA access. Apply and remove short circuit to T and R test jacks exactly as specified in 3.01. Do not pulse switch as this will result in cutoff of established DDD calls by way of associated auxiliary trunks.

3.01 A white shelf PS lamp indicates the shelf on which a permanent condition exists. For digit-absorbing selectors, check for permanents by momentarily shorting the T and R test jacks of each normal selector with a 477A tool or equivalent. Each normal selector will step to the first level and release. Permanent selectors will not step when the test jacks are shorted.

3.02 For selectors other than digit-absorbing selectors, check for a permanent condition by momentarily raising the shaft of each normal selector until the off-normal springs operate. The release armature will operate, causing a loud click on normal selectors, but will not be energized on permanent selectors.

3.03 With the handset key in the MON position, monitor on the permanent switch for about 3 seconds.

3.04 If dialing does not start, operate handset key to TALK position. Challenge by saying, "What number did you call, please?" If a response is received, say, "This is the Telephone Company. Will you hang up, please?" or "Will you hang up for a moment, please, and dial your call again?" Observe that the switch releases.

3.05 If there is no response or the switch does not release, record the first selector and necessary tracing information on the permanent signal tracing ticket, Form E-3937. For selectors other than digit-absorbing selectors, check for other permanents by grounding the sleeve of the selector with a 477A tool, or leave the handset plugged in, and raise the shaft until the off-normal springs operate. This will silence the permanent signal alarm unless there are other

permanent signals in the office. If the alarm is not silenced, observe if the shelf PS lamp is extinguished. If it is not extinguished, this indicates that there is more than one permanent selector on the shelf and it will be necessary to check each normal selector on the shelf. To extinguish a shelf permanent signal lamp when several switches on the same shelf are held permanent, or to observe permanent signal shelf lamp not visible from switch location, proceed as follows: Ground the sleeve of permanent selector with a 477A tool and lift shaft of switch high enough to cause the vertical-off-normal springs to make. Secure the shaft in this position using the piece of string in the manner described in 2.04. Secure as many held permanent switches as required on the shelf to extinguish the permanent signal shelf lamp. Remove string and 477A tool from switches after each permanent has been noted.

3.06 The switch shaft of digit-absorbing first selectors, such as SD-32183-01, should not be raised to check for other permanent signals on the shelf because the rotary mechanism will be energized and the wipers may be damaged. The tracing information required on this selector should be recorded on the permanent signal tracing ticket, Form E-3937, and then all other normal selectors on the shelf should be checked as described in 3.01 to determine if other permanent signals exist on the shelf. No attempt to extinguish the shelf PS lamp need be made on shelves equipped with digit-absorbing selectors.

3.07 If there are other permanents, locate them and record the necessary tracing information as just described. (See 1.04.)

Line Finder Offices

3.08 Trace the connection back to the line finder, monitor using the handset, and then challenge as described in 3.03 and 3.04. If there is no response, the line finder terminal should be listed as permanent. The line finder terminal of 100-point line finder banks may be read directly. The line finder terminal, where 200-point banks are in use, may be identified by removing the switch cover and observing if the F and B relays are operated. Only the F relay will be operated if the permanent line is in the lower bank. Both relays will be operated if the permanent line is in the upper bank.

3.09 List the permanent line (connector or line information) on the tracing ticket, Form E-3937, report it to the test center, and post it on the record of permanent signals, Form E-3938. Make an entry in the SL-GRD column only when the sleeve is grounded.

3.10 In offices where it is required to report the connector terminal number to the test center, enter it in the Conn. Term. column. If the sleeve is to be grounded, enter the line information also.

Line Switch Offices

3.11 Trace the connection back from the first selector to the permanent primary line switch, monitor, and then challenge as described in 3.03 and 3.04. If there is no response, the bay and line should be listed as permanent.

3.12 List the permanent line (connector or line information) on the tracing ticket, Form E-3937, report it to the test center, and post it on the record of permanent signals, Form E-3938. Make an entry in the SL-GRD column only when the sleeve is grounded.

3.13 In offices where it is required to report the connector terminal number to the test center, enter it in the Conn. Term. column. If the sleeve is to be grounded, enter the line information also.

B. Locating Permanents Connected to Permanent Signal Holding Trunks

3.14 Offices equipped with permanent signal holding trunks without automatic number identification are alerted to permanent signals by a minor alarm or referred by the trouble operator. A flashing (120-ipm) class lamp (CN or NC) at the permanent signal trunk unit identifies the particular trunk. The local test desk gains access to the trunk by dialing two digits required by the test trunk and selector circuit. When the trunk is seized by the test trunk and selector, the minor alarm is retired and the class lamp flashes at 60 ipm. High tone may be monitored for any seized trunk by means of the test trunk and selector circuit; however, when the trunk is cut through to the test trunk and selector, the high tone is removed.

3.15 When the permanent signal holding trunk was seized, the originating register or dial pulse converter outpulsed 1, 2, or 3 digits required to reach the trunk. In determining the particular switches involved with a permanent signal, the selector group associated with the seized trunk is determined from office records. The tester monitors for high tone in associated selector and line finder groups until the particular line finder involved is located. The line finder is then released in an approved manner which releases the switch train and the permanent signal holding trunk.

ANI Offices

3.16 For offices equipped for automatic number identification, at the end of a time interval as determined by local procedure, initiate an ANI-B permanent signal identification procedure.

3.17 At the ANI trouble ticketer frame, connect the cord of the permanent signal identification circuit to the PS- jack associated with the particular trunk on which the permanent signal is held. The line is then identified in the same manner as on ANI service call, but the outpulser passes the identify of the line along with a PS indication to the trouble ticketer circuit.

3.18 The ANI trouble ticketer circuit will then print a permanent signal record ticket containing the office directory number of the line that is in a permanent signal condition. The TPD lamp at the trouble ticketer frame will light to indicate a ticket has been printed.

3.19 Remove PS cord from PS- jack to restore circuit to normal.

Caution: *If PS cord is allowed to remain in the PS jack, the ground on the cord will hold up the connection all the way through the switch train even after the permanent signal condition is removed. The customer is denied service until the PS cord is removed*

C. Release of Equipment Held by a Permanent Line

3.20 At the request of the test center, free the permanent line of central office equipment by one of the following methods:

- (1) Use a plugging-up circuit as described in Part 4.

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- (2) Ground the sleeve terminal of the permanent line as described in subsequent paragraphs.

Line Finder Offices

3.21 At line finder bank terminal strips not arranged for solderless wrapped connections, ground the sleeve terminal of the permanent line using a W1M cord if a ground terminal strip is provided. Otherwise, use a W1U cord and connect to frame ground. For solderless wrapped line finder bank terminal strips, ground the sleeve of the permanent line using a W1AL cord.

3.22 Release the line finder by manually rotating the shaft sufficiently for the wipers to clear the bank terminals of the permanent line.

Line Switch Offices

3.23 Ground the sleeve terminal of the permanent line at the vertical intermediate distribution frame (VIDF) using a W1U cord connected to frame ground.

3.24 Release the primary lines switch held by the permanent line by manually restoring its plunger.

Both Line Finder and Line Switch Offices

3.25 After grounding the sleeve, locate the line information on the record of permanent signals, Form E-3938, and enter initials and time in the SL-GRD column.

3.26 Upon request from the test center, lines served by hunting connectors, when permanent, should be treated as follows:

- (1) With a small group, when all are permanent, use a plugging-up circuit on the first line and ground the sleeves of the others.
- (2) With a large group, when all are permanent, use a plugging-up circuit on several of the first choice lines and ground the sleeves of the others.
- (3) When only part of the group is permanent, ground the sleeves of the permanent lines.

Where plugging-up circuits are not provided, follow local instructions.

D. Locating Permanents at Local Incoming Selectors

3.27 When permanent signal alarms appear, check each normal selector on the shelf until the permanent is located.

3.28 For digit-absorbing selectors, check for permanents by momentarily shorting the T and R test jacks of each normal selector with a 477A tool or equivalent. Each normal selector will step to the first level and release. Permanent selectors will not step when the test jacks are shorted.

3.29 On selectors not arranged to absorb digits, check for a permanent condition by momentarily raising the shaft of each normal selector until the off-normal springs operate. The release armature will operate, causing a loud click on normal selectors, but will not be energized on permanent selectors.

3.30 Monitor using the handset and then challenge as described in 3.03 and 3.04. If there is no response, record the trunk as permanent on the permanent signal tracing ticket, Form E-3937. For selectors other than digit-absorbing selectors, with the handset still connected, raise the shaft and ascertain if the permanent alarm is silenced. This silences the permanent signal alarm unless there are other permanent signals in the office. If the permanent signal alarm is not silenced, observe if the shelf PS lamp is extinguished. If the shelf lamp is not extinguished, this is an indication that there is more than one permanent selector on the shelf and it will be necessary to check each normal selector on the shelf. To extinguish a shelf permanent signal lamp when several switches on the same shelf are held permanent, or to observe permanent signal shelf lamp not visible from switch location, proceed as follows: Ground the sleeve of permanent selector with a 477A tool and lift shaft of switch high enough to cause the vertical-off-normal springs to make. Secure the shaft in this position using the piece of string in the manner described in 2.04. Secure as many held permanent switches as required on the shelf to extinguish the permanent signal shelf lamp. Remove string and 477A tool from switches after each permanent has been noted.

3.31 The switch shaft of digit-absorbing incoming selectors, such as SD-32183-01, should not be raised to check for other permanent signals on the shelf because the rotary mechanism will be energized and the wipers may be damaged. The trunk information should be recorded on the permanent signal tracing ticket, Form E-3937, then all other normal selectors on the shelf should be checked as described in 3.28 to determine if other permanent signals exist on the shelf. No attempt to extinguish the shelf PS lamp need be made on shelves equipped with digit-absorbing selectors.

3.32 If there are other permanents, locate and record them as just described.

3.33 Report permanent incoming selectors in accordance with local instructions.

3.34 More than one or two permanents on incoming selectors may be an indication of a possible trunk cable failure. Report suspected cable failures immediately to the test center and to the central office supervisor.

3.35 Certain incoming trunks from selector repeaters in a branch office are arranged so that the trunk may be released by applying battery to the tip of the incoming selector test jack. For incoming selectors other than digit-absorbing selectors, such as SD-32183-01, ground the sleeve of the selector with a 477A tool; raise the shaft to operate the off-normal springs; and using the cords assembled as shown in Fig. 1, apply battery with the 411A tool to the tip of the selector test jack for 2 to 5 seconds. If the permanent cannot be released in this manner, it may be an indication of trunk cable trouble.

3.36 For digit-absorbing incoming selectors, such as SD-32183-01, ground the sleeve of the selector with a 477A tool; manually hold operated the D relay; and using cords assembled as shown in Fig. 1, apply battery with a 411A tool to the tip of the selector jack for 2 to 5 seconds. If the permanent cannot be released in this manner, it may be an indication of trunk cable trouble.

E. Locating Permanents at Local Selectors Other Than First or Incoming

Note: If the digit-absorbing feature is operative on local selectors, the procedure described for locating permanent signals in first and incoming selectors should be followed to prevent the rotary mechanism from being energized and the possible chance of the wipers being damaged.

3.37 When permanent signal alarms appear, check each normal selector on the shelf by momentarily raising and lowering the shaft. The release armature will operate, causing a loud click on normal selectors, but will not be energized on permanent selectors. Monitor using the handset and then challenge. If there is no response, disconnect the handset and transfer the permanent back to the first or incoming selector by raising the switch shaft until the vertical off-normal springs operate. Permit the switch to return to normal; then using the handset, dial it to any level and observe that it operates and releases properly. Record the local selector on the tracing ticket, Form E-3937.

F. Locating Permanents at Toll Switching Train Selectors

3.38 When a permanent signal alarm appears, check each normal selector on the shelf by momentarily raising and lowering the shaft. The release armature will operate, causing a loud click on normal selectors, but will not be energized on permanent selectors.

3.39 Monitor using the handset and then challenge. If there is no response, record the switch as permanent on the tracing ticket, Form E-3937. With the handset still connected, raise the shaft and ascertain if the permanent signal alarm is silenced. This silences the permanent signal alarm unless there are other permanent signals in the office. If the permanent signal alarm is not silenced, observe if the shelf PS lamp is extinguished. If the shelf lamp is not extinguished, this is an indication that there is more than one permanent selector on the shelf and it will be necessary to check each normal selector on the shelf. To extinguish a shelf permanent signal lamp when several switches on the same shelf are held permanent, or to observe per-

manent signal shelf lamp not visible from switch location, proceed as follows: Ground the sleeve of permanent selector with a 477A tool and lift shaft of switch high enough to cause the vertical-off-normal springs to make. Secure the shaft in this position using the piece of string in the manner described in 2.04. Secure as many held permanent switches as required on the shelf to extinguish the permanent signal shelf lamp. Remove string and 477A tool from switches after each permanent has been noted.

3.40 If there are other permanents, locate and record as just described.

3.41 Trace each permanent back to the originating trunk and report permanent condition in accordance with local instructions.

G. Locating Permanents at Connectors

3.42 When a connector permanent alarm appears, monitor using the handset on each off-normal connector on the shelf. Challenge on those on which no conversation or ringing induction is heard. If a response is received say, "This is the Telephone Company. Your party has disconnected. Will you hang up, please?" or "This is the Telephone Company. Will you please hang up for a moment and then try your call?" Observe that the switch releases.

Calling Party Control

3.43 If no response is heard, determine if the connector is held by a toll operator or by a calling party. A combination connector held by a toll operator will not normally light the shelf supervisory lamp; however, it may be mistaken for a permanent connector when both conditions are present on a shelf. Monitor on the toll side of the connector test jacks. A combination connector held by toll will usually be indicated by conversation being heard. If conversation is not heard, disconnect the handset from the test jacks. Make contact between the tip and ring of the 240A plug (handset) and the 2 and 3 springs of the test jack. Momentarily operate and release the TALK-MON key of the handset at least twice. If a click is heard in the receiver, the indication is that the calling line is permanent. If no click is heard the usual indication is that the switch is being held over the toll train. This can further

be verified by removing the switch cover and observing that the J relay is operated if held by the toll train.

Joint Control

3.44 When the handset key is operated to the TALK position, the A relay will be heard to operate if the connector is held by a called party.

3.45 If the A relay is not heard to operate, the connector is held by a calling party. Combination connectors may be held by a toll operator. Determine which holds the connector as in 3.43.

3.46 The connector may also be held by a line circuit connector lockup where connectors are arranged for joint control. Dial tone, as well as the operation of the A relay, will be heard under this condition. Proceed in accordance with local instructions. The connection may be released by opening simultaneously both the tip and ring wipers using an orange stick. Hold the shaft at the lower wiper.

H. Release of Calling Party Connector Permanents

Where Release Circuit SD-32021-01 Is Provided

3.47 Operate the PS-RLS key of the permanent signal release circuit. Connect the P3AA cord to the release circuit and insert the 240A plug of this cord into the switch test jack. The connector should release within 10 seconds and the permanent will reappear in the first or incoming selectors. The release circuit may not be effective on very short loops or if used simultaneously on two or more connections. If after a second attempt the switch does not release, proceed as in 3.49.

3.48 When the switch releases, using the handset, dial 99 and observe that it operates and releases properly. It will reappear as an incoming repeater, incoming selector, or first selector permanent. Record the released connector switch and shelf number on the tracing ticket, Form E-3937.

Where Release Circuit SD-32021-01 Is Not Provided

3.49 Trace the connection back to the selector which will indicate whether or not the call originated over a 2-wire trunk. If it did not originate over a 2-wire trunk, monitor using the handset and then challenge on this selector. If it did originate over a 2-wire trunk, trace the connection back to the incoming selector, monitor, and then challenge on that selector. In either case if there is no response, release the selector by holding the shaft at the lower wiper, and using an orange stick, just break contact between the ring wiper and bank contact. Allow the switch to restore to normal.

3.50 Using the handset, dial the selector to any level and observe that it operates and releases properly. The permanent will reappear in the first or incoming selectors.

3.51 Make a record of the connector and the selector thus released on the tracing ticket, Form E-3937.

I. Release of Called Party Connector Permanents

3.52 Record the connector terminal number as a permanent signal on Form E-3938 and report it as a connector permanent to the test center. Release the connector by holding the shaft at the lower wiper, and using an orange stick, just break contact between the ring wiper and the bank contact. Allow the switch to return to normal. Using the handset, dial 99 and observe that it operates and releases properly.

3.53 The permanent will reappear in the first or incoming selectors and normally should be handled by the test center before timing in as a permanent signal alarm.

J. Release of Permanents Reported from Other Offices Interoffice Trunks

3.54 Trace back to the outgoing selector, monitor, and then challenge. If there is no response, release the switch by holding the shaft at the lower wiper. Using an orange stick, just break contact between the ring wiper and the bank contact. The release armature will operate. Allow the switch to return to normal. The permanent will reappear as a first selector permanent. Using the handset, dial the switch to any level

and observe that it operates and releases properly. Record the name and number of the trunk on the tracing ticket, Form E-3937.

Special Service Trunks

3.55 Miscellaneous special service trunks such as information repair, test desk, recording, zero level, etc, reported to the switchroom as permanent should be released at the first selector or service code selector. Locate the selector on which the trunk is held, monitor, and then challenge. If there is no response, hold the shaft of the switch at the lower wiper. Using an orange stick, just break contact between the sleeve wiper and the bank contact. The release armature will operate. Allow the switch to return to normal. The permanent will reappear as a first selector permanent. Using the handset, dial the switch to any level and observe that it operates and releases properly. Record the name and number of the trunk on the tracing ticket, Form E-3937.

K. Handling an Excessive Number of Permanents**Line Finder Offices**

3.56 When an excessive number of permanents occur, they should be located by monitoring and challenging on each off-normal line finder. If there is no response, determine the permanent line as described in 3.08. Ground the sleeve with a W1M, W1U or W1AL cord and release the line finder by manually rotating the shaft sufficiently for the wipers to clear the bank terminals of the permanent line.

3.57 List the permanents directly on the record of permanent signals, Form E-3938. Enter the line information and connector terminal, if required, and the time and initials in the SL-GRD column. Report the first six at once to the test center, advising the possible extent of the overload condition and that the sleeve is grounded. Additional permanents should be reported to the test center in accordance with local instructions.

Line Switch Offices

3.58 When an excessive number of permanents occur, they should be located by monitoring and challenging on each operated primary line switch. If there is no response, block the

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BCO relay contacts operated with the 324 tool and release the switch by manually restoring the plunger.

3.59 List the permanents directly on the record of permanent signals, Form E-3938. Enter the line information and connector terminal, if required. Report the first six at once to the test center, advising the possible extent of the overload condition. Additional permanents should be reported to the test center in accordance with local instructions.

3.60 When the overload condition is under control:

- (1) Confer with the test center.
- (2) Ground the sleeve of each permanent line at the VIDF with a W1U cord connected to frame ground.
- (3) Remove the 324 tool from the BCO relay.
- (4) Enter the time and initials in the SL-GRD column of the record of permanent signals, Form E-3938.

Line Finder and Line Switch Offices

3.61 Following a period when the sleeves have been grounded on an excessive number of customer lines, contact should be maintained with the test center with regard to the progress of trouble clearing. As soon as conditions indicate the need, a patrol should be set up to remove the ground from the sleeves of lines that might be clear.

3.62 If the test center is unable to furnish a list of cleared lines promptly, due to excessive trouble or due to several cables in the process of being cleared at one time, the patrol should check each line by removing the sleeve ground. If the line is reseized, monitor and then challenge. If there is no response, replace the sleeve ground and release the line finder or line switch.

3.63 If the line is not reseized, insert the 240A plug of the handset between the tip and ring of the line (at the terminal where the sleeve ground is applied). Operate the TALK key. Dial tone should be heard. Operate the MON key. Dial tone should not be heard.

3.64 If dial tone is still heard with the MON key operated, replace the sleeve ground and release the line finder or line switch.

3.65 If dial tone is not heard with the MON key operated, the line may be assumed to be clear and should be shown restored on the record of permanent signals, Form E-3938. Enter the initials and time restored in the RESTD column for each sleeve ground removed. The patrol should be repeated at such intervals as conditions indicate until the trouble situation is under control.

Permanent Signal Holding Trunk Offices

3.66 For multiple number of permanent signals in TOUCH-TONE calling or common control offices equipped with permanent signal holding trunks, use the procedure described in 3.56 through 3.65. The permanent signal alarm unit associated with the permanent signal trunks can be strapped to bring in a major alarm when from 2 to 35 permanent signals are present. The alarm circuit is cut off and restored by inserting a make-busy plug (258-type) into the P jack and momentarily operating the AR key on the permanent signal holding trunk alarm circuit. To locate a cable failure, monitor for high tone applied to the sleeve conductors of all customer lines connected to a permanent signal holding trunk. Connect one side of test set through a capacitor to ground and with the other side of test set, run down the sleeve terminals of the directory number or line equipment terminal strips. When a number of lines are found with tone on the sleeve terminals, refer them to the repair service before completing the test of the remaining lines. This procedure shall be repeated until the defective cable has been identified or until all the lines have been tested.

L. Restoration of Service

3.67 Lines on which the sleeve is grounded are to be restored at the direction of the test center except in those cases where emergency conditions justify a patrol.

3.68 When service is restored by removing the sleeve ground, an entry should be made of the initials and time restored in the RESTD column of the record of permanent signals, Form E-3938.

4. RELEASE OF EQUIPMENT HELD BY PERMANENTS BY USE OF PLUGGING-UP CIRCUITS

4.01 Normally, no records are required in the central office in connection with the use of plugging-up circuits; however, the tracing ticket, Form E-3937, may be used to list the cable and pair and the plugging-up circuit as a convenient record while the patching cords are placed.

4.02 Plugging-up circuits are designed to signal when the line is cleared. Lines using a circuit which is supervised entirely by the A switchboard are to be restored at the direction of the test center. Lines using circuits that are supervised by the switchroom are to be restored on signal after consulting the test center.

Supervision at the A Switchboard

4.03 Upon request from the test center, remove the heat coils and patch from the protector to the plugging-up circuit with a 4W6A cord or 4W11A cord where the frame is equipped with 300-type connectors (or the replaced 121-type protector). Where 444-type jacks are provided in place of protectors, patch with a 4W7A cord. Advise the test center the number of the plugging-up circuit used.

Note: When the line to be put on a plugging-up circuit is associated with a long line circuit, the cord should be connected to the protector or 444-type jacks on the central office side of the long line circuit for intercept service. (In some instances, certain plugging-up circuits are reserved for this purpose.) Another plugging-up circuit should be connected to the line conductors for trouble observation and test.

4.04 Upon request from the test center, the patching cord may be reversed at the protector.

Supervision in the Switchroom

4.05 Upon request from the test center, remove the heat coils and patch from the protector to the plugging-up circuit with a 4W6A cord or 4W11A cord where the frame is equipped with 300-type connectors (or the replaced 121-type protector). Where 444-type jacks are provided in

place of protectors, patch with a 4W7A cord. Advise the test center the number of the plugging-up circuit used.

4.06 Upon request from the test center, the patching cord may be reversed at the protector.

4.07 The green lamp at the plugging-up circuit panel will light to indicate that the circuit is in use.

4.08 A permanent signal will also light the red lamp and the audible signal will operate. The red lamp should be extinguished and the audible signal silenced by operating the TR key.

4.09 The customer line may be extended to the test center by patching with the P3E cord from the line jack to the test jack, if provided, at the plugging-up circuit panel, or the test center may reach the line by means of a test connector.

4.10 If the red lamp lights intermittently, challenge on the customer line (patch with the P3E cord to the telephone circuit). If a customer is found on the line, advise him that you are working on the circuit, call the test center for a test, and restore service at their direction. If the flashing is caused by a change in the line condition, remove the patching cord, replace the heat coils, ground the sleeve, and release the equipment. Locate the line information entry on the record of permanent signals, Form E-3938, and post the initials and time in the SL-GRD column and advise the test center.

4.11 Upon the steady lighting of the red lamp and the operation of the audible signal, the test center should be advised and service restored at their direction.

Supervision in the Switchroom and Automatic Cut-Through Provided

4.12 Where automatic cut-through is provided, 4.13 and 4.14 apply in addition to 4.03 through 4.11.

4.13 During periods when the switchroom is not covered, the CT key should be operated on all plugging-up circuits in use. Under this con-

dition, if the trouble on the line is cleared, and after a timing interval, the line will automatically restore to normal service. The red lamp will light to indicate that service has been restored.

Note: In addition to operating the CT key, the TR key should also be operated to provide automatic cut-through in cases where the line trouble condition is caused by an open.

4.14 At the first cycle of tracing permanent signals, a check should be made each day of the plugging-up circuit panel.

- (1) Restore CT keys and TR keys, if operated, on circuits on which the red lamp is not lighted.
- (2) Monitor and then challenge on those lines on which the red lamp is lighted. If there is no response, restore the CT key and TR key, if operated. If the line is still clear, the red lamp will again light and an audible signal will be initiated. Restore service by removing the 4W6A, 4W7A, or 4W11A cord and replacing the heat coils; then advise the test center.

Supervision for Automatic Timed Release of Connectors

4.15 In offices arranged for automatic timed release of connectors, it is necessary to cancel the timed release feature for all numbers that are connected to plugging-up circuits. This is done by means of jacks which are shown on the intercepting trunk circuit and located on the vertical side of the main or combined distributing frame. One jack is provided for each 100-point connector group and each 200-point connector shelf.

4.16 When a line is placed on trouble observation and interception, a dummy plug is also inserted in the appropriate jack for each number on the line whether individual or multiparty, thus canceling the timing on those connector hundreds.

5. PROCEDURE FOR PERMANENT SIGNAL RECORD TICKET ANALYSIS

5.01 The permanent signal record ticket is a slip of yellow paper approximately 4-1/4 inches long and 2-1/2 inches wide with a row of

35 numbers, dashes, and asterisks printed along the top. The remainder of the ticket is blank and provides space for the comments of maintenance personnel. Each character printed, a dash (—), an asterisk (*), or a number (from 0 through 9) under the 35-character positions on the ticket has a meaning as shown in CD-95816-01 and in SD-95816-01 information notes of the trouble ticketer circuit. Table A shows a typical permanent signal record ticket.

5.02 Character positions 11 through 15 give the office and numerals of the billable number assigned to the line that is in a permanent signal condition. The number under character position 11 stands for the office and the office records will specify the particular office.

5.03 When character position 16 shows a 7, it indicates a line other than a multiparty line was identified. When an 8 is recorded, it is a multiparty line and character positions 11 through 15 will show dashes to indicate that office and numerals cannot be identified.

5.04 On 2-party lines, the PS record will always be the ring party unless the ring party is not connected at the number network, regardless of which station has the permanent signal condition. When the ring party is not connected and the tip party is connected at the number network, the PS record will show the tip party number. If no cross connections have been placed for a particular number, a PS record attempt would result in an identification failure. If the identity of both stations on a 2-party line is required, the office records must be consulted.

5.05 The networks associated with the trunks in a PBX group are usually multiplied at the number network to permit the directory number of one trunk to be used for billing purposes for the entire group. The PS record will show the billable number only, which may or may not be the particular line responsible for the permanent signal condition.

Permanent Signal Identification Failures

5.06 If the ANI equipment is unable to identify the line, a trouble ticket (5 inches long) is printed (provided the trouble ticketer is not busy) and the TPD lamp does not light.

TABLE A — TICKET ANALYSIS

CHARACTER POSITION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35				
	*	*	9	0	0	—	0	9	0	—	0	3	4	0	1	7	—	*	—	9	0	0	0	—	1	0	—	—	—	1	5	3	0	*	*				
Margin																																							
Permanent Signal-Record Ticket																																							
Always Zeros — Trunk Subgroup 0 Tens & 0 Units																																							
Always a Dash — No Trunk																																							
Number Registered on PS Call																																							
Outpulser Used																																							
Identifier Released																																							
Identifier Group Number																																							
Spacer																																							
Office & Numericals of Billable																																							
Number of Line in PS Condition (—) Dash for Multiparty Line																																							
Multi- or Nonmultiparty Indication — Eight for Multiparty Line																																							
Outpulser Progress — See Positions 25 & 26																																							
Identifier Progress — See Position 20																																							
Spacer																																							
Outpulser Progress — Identifier Released																																							
Spare																																							
Spacers																																							
Time of Day, Hours, & Minutes																																							
Margin																																							

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Failures may occur under the following conditions.

- (a) Permanent signal was removed before PS identification procedure was initiated.
- (b) Attempting to identify coin line not connected to the number network.
- (c) Attempting to identify a step-by-step line using this office as a tandem office.
- (d) Premature removal of the PS cord from the PS- jack.
- (e) Condition (d), described above, followed by the too rapid insertion of the cord into the PS-jack of the different identifier group.

6. REPORTS

6.01 Included in this section are copies of standard forms for use in connection with tracing and recording permanent signals in step-by-step dial central offices.

Permanent Signal Tracing Ticket

6.02 Form E-3937 provides a convenient means of recording tracings of permanent signals and those released without tracing. This record permits an analysis that may point to equipment causing "lockups" or "no releases" which might not be readily located under normal testing.

6.03 The form provides a space for the plugging-up circuit, the cable and pair, and a space to indicate a grounded sleeve.

6.04 At the end of each tracing period, lines should be reported to the test center and posted to the record of permanent signals, Form E-3938. The tracing ticket may then be filed.

Record of Permanent Signals

6.05 Form E-3938 is used as a record of line information or connector terminals reported as permanent to the test center.

6.06 In those cases where the line equipment is not released or is released by use of plugging-up circuits, no further entry is required on this form.

6.07 In those cases where the sleeve is grounded to release the line equipment, the record on this form should be maintained until service is restored.

6.08 Whenever the occasion requires that permanents be picked up directly at the line finder or line switch, they may be posted directly to this form.

6.09 One sheet may be used for several days by writing the date in on the next vacant line after the previous day's record.

PERMANENT SIGNAL TRACING TICKET
STEP-BY-STEP OFFICES

Office	Date	Initial
Bay Sel.		
Grp. L. F.		
Bay L. Sw.		
Grp or Bay Term. or Line		
SL Grded		
Cable Pair		
P. U. Ckt.		
Conn. Term.		
* Trk.		
* Bay or Shelf * Sw.		

* Released without tracing.

Form E-3937

6.10 The form may be filed after all lines, on which the sleeves have been grounded, have been restored or those not restored carried over to the next sheet. Lines that do not have the sleeve grounded need not be carried over to the new sheet.

6.11 When a line is carried over to a new sheet, a red check mark should be entered in the RESTD column of the old sheet to show that it was carried over. The original entry should then be posted to the new sheet with a red pencil.

6.12 If desired, the form may be kept in duplicate to provide a copy for the test center.

6.13 Sample #1 on Form E-3938 shows posting where only the group and terminal or bay and line are required. Listed are the two lines affected, time reported, time sleeve grounded, and time restored. Sample #2 shows posting where it is required to report by connector terminal and where the sleeve has been grounded. Listed are connector terminal numbers, time reported, time grounded, and time restored. Sample #3 shows posting where it is required to report by connector terminal and where the sleeves are not grounded. Listed are connector terminal numbers and time reported.

RECORD OF PERMANENT SIGNALS STEP-BY-STEP OFFICES

Date 4-19-61

Form E-3938